

# PATENT SPECIFICATION

778,600



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## COMPLETE SPECIFICATION

### Vaporizing Dispenser for Air Treating Gels

We, AIRKEM, INC., a corporation organized and existing under the laws of the State of New York, United States of America, located at 241 East 44th Street, New York 17, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a vaporizing dispenser for air treating gels having a vaporizing zone, a storage zone for bodies of air treating gel, and means intermediate the two zones for controlling the delivery of bodies of air treating gel to said vaporizing zone. More particularly the invention relates to a vapor diffuser of the class described for use with cylindrical bodies of air treating gel in which a plurality of cylindrical bodies arranged in horizontal position and having essentially linear contact therebetween are arranged in a storage zone which is substantially sealed from circulating air by engagement between the lowermost of said cylindrical bodies and a restricted discharge opening into a vaporizing zone. Still more particularly the invention relates to a vapor diffuser of the class described wherein the restricted discharge between the storage zone and vaporizing zone bears such a relationship to the original diameter of the cylindrical gel bodies as to allow substantially complete evaporation of each gel body in the vaporizing zone before the next successive cylindrical body is delivered thereto from the storage zone.

Air treating gels of the type disclosed in United States Patent No. 2,691,615 wherein an aqueous medium containing 1 to 10% of a mixture of volatile air treating components is solidified by means of a small amount i.e. 1 to 4% of an aqueous gelling agent provide a very effective means for introducing into air a uniform quality vapor mixture for effecting deodorization and other treatments of the air which involve the introduction of volatilizable

[Price 3s. 6d.]

components thereto. It has been found, however, that when adapting such gels to uses in which continued functioning for extended periods i.e. a month or more before a starting quantity or charge of gel is expended there is distinct advantage in employing a certain quantity of gel in the form of a plurality of smaller bodies rather than a single large body. One reason for this is that with a single large body of gel it is possible, particularly with extended high rate evaporation for the outer surface of gel to become hard and dry before all of the volatilizable materials from within the gel have diffused to the surface for evaporation. While this is not so readily encountered in instances when the gel is subjected to intermittent uses of short duration, it will be evident that a product intended for use in the treatment of air should, if possible, function equally well under all conditions of use, whether intermittent or continuous, slow or rapid.

When employing a plurality of smaller bodies of gel, the full advantage in inherent use of smaller bodies is realized only if successful gel bodies are delivered individually to an evaporation zone as and when needed as indicated by the falling off of volatilization from the body or bodies of gel previously delivered to such zone. The new vapor diffuser in accordance with the present invention provides in a very efficient way for the automatic individual delivery of gel bodies to a reaction zone as needed and operates equally well whether the device is in use continuously, or intermittently, or is adjusted for slow or rapid volatilization therefrom. At the same time the device is attractive in appearance, simple in construction, and readily adapted for inexpensive production, as for example by molding from plastic materials.

Novel features of the invention will readily be apparent from a consideration of the following description taken together with the accompanying drawing in which preferred embodiments of the invention have been shown

with the various parts thereof identified by suitable reference characters in each of the views and in which:—

Fig. 1 is a perspective view of the device  
5 adjusted to a partially open position;

Fig. 2 is a front elevation view of the device  
as shown in Fig. 1 with part of the structure  
broken away and in section;

Fig. 3 is a sectional view substantially on the  
10 line 3—3 as seen in Fig. 2; and

Figs. 4, 5 and 6 are partial views similar to  
Fig. 3 showing different stages of operation of  
the device.

As shown in Figs. 1 to 3 of the drawing the  
15 vapor diffuser comprises a base 10, a body  
portion 11 and a telescoping lid or closure part  
12. These three interfitting parts, together  
form an upper storage chamber 13 and a lower  
volatilization chamber 14 for cylindrical bodies  
20 of air treating gel 15. The base 10 which may  
be fashioned from a flexible or rubber-like  
plastic is provided in closely spaced relation to  
its peripheral edges with an undercut groove 16  
25 for receiving in snap or frictional engagement an  
outwardly extending bead or flange 17 which  
extends around the periphery of the lower end  
of the body part 11. At longitudinally spaced  
intervals the base 10 is provided with slightly  
30 elevated saddles 18 extending transversely of  
the base and having depressed central portions  
as seen at 19 in Fig. 3. The saddles 18 serve  
the dual function of centering a gel body 15  
within the volatilization chamber 14 and  
35 elevating the gel body slightly above the  
surface 20 of the base.

The body part 11 in its transverse cross-  
section as seen in Fig. 3 has an upper portion 21  
which is of a width to receive closely but freely  
cylindrical gel bodies 15 of a predetermined  
40 diameter, and a lower portion 22 which is of  
greater width than the upper portion 21 and  
joining the upper portion 21 in a tapered wall or  
ledge 23. In substantial alignment with the  
tapered walls or ledges 23 and extending  
45 inwardly and downwardly of the device are  
narrow ribs or vanes 24 forming a restricted  
passage 25 between the storage chamber 13  
and volatilizing chamber 14.

The restricted passage 25 serves the dual  
50 purpose of essentially sealing the storage  
chamber 13 from the volatilizing chamber 14  
by establishing lines of contact between the  
lowermost gel body 15 and the ribs 24. The  
particular width of the opening 25 or spacing  
55 between the free ends of the ribs 24 is preferably  
about 75% of the starting diameter of the gel  
body 15 and as more fully hereinafter described  
in discussing Figs. 4 to 6 of the drawing it is  
the size of the discharge opening 25 which  
60 makes possible the unique effectiveness of the  
device.

The further control of the device to prevent,  
permit and regulate volatilization of material  
65 from the chamber 14 is provided by vertical  
adjustment of the lid 12 with respect to aper-

tures 26 in opposed longitudinal walls of the  
lower portion 22 in the body part 11. It will  
be noted that the lid or closure 12 has a closed  
top 27 which is suitably of a domed contour,  
upper longitudinal walls 28 spaced to closely  
70 engage the upper portion 21 of the body part,  
beveled ledges 29 conforming to the ledges 23  
of the body part and lower longitudinal walls  
30 adapted to over-lie the apertures 26 and  
suitably engaging inwardly offset or recessed  
75 surfaces 31 in the lower portion 22 of the body  
part. These inwardly offset or recessed surfaces  
31 preferably continue on transverse end walls  
32 of the body part 11 as will be apparent from  
a consideration of Figs. 1 and 2 of the drawing.  
80

In fashioning the body part 11 and the aper-  
tures 26 and inwardly offset walls 31 it will be  
noted that by extending the inwardly offset  
wall portions 31 which border the apertures 26  
85 below such apertures as the ribs 33, seen in  
Figs. 2 and 3, it is possible to form all parts of  
the body 11 in a single molding or casting  
operation between linearly interfitting molds.

The vertical adjustment of the lid or closure  
12 for adjusting the extent of opening of the  
90 apertures 26 and thus regulating the rate of  
volatilization of material from the device can  
be facilitated by suitable positioning or aligning  
means such as the visual indicator in Fig. 1 of  
the drawing. This visual indicator which for  
95 purpose of illustration has been shown as  
providing normal positions of closed, one-third,  
open, two-thirds open and fully open comprises  
a stepped cutout 34 in one end 12' of the  
closure or lid 12 and an interfitting stepped  
100 portion 35 protruding from the inwardly offset  
portion 31 of end wall 32 of said body part.  
In Fig. 1 of the drawing the control indicates  
a setting at which the apertures 26 are one-  
third open and it will be apparent that other  
105 desired adjustments can readily be obtained by  
suitably aligning the stepped portions of the  
recess or cutout 34 and protrusion 35.

In the device as shown in the drawing the  
storage chamber 13 accommodates two bodies  
110 15 of gel and the volatilizing chamber 14 can  
initially accommodate one body of gel as shown  
in the dotted line position in Figs. 3 and 4 of  
the drawing. Thus the device could initially  
be so distributed as a package unit loaded with  
115 three bodies or slugs of gel 15. It will be  
understood in this connection that by merely  
extending the upper portion of the device the  
storage chamber 13 could be made to accom-  
modate more than two gel bodies 15 and con-  
120 sistent with the rate at which gel is to be con-  
sumed such vertical extension of the device  
might be desired. The device as shown in the  
drawing, however, represents a practical size  
for normal home use with a deodorizing gel  
125 which would provide a month or more of  
normal intermittent service before recharging  
with gel is necessary.

As air treating gels of the type disclosed in  
United States Patent No. 2,691,615 evaporate 130

on exposure to air, liquid medium is continuously diffused from within the gel to the surface of the gel causing a gradual shrinkage in the size and shape of the gel. If a mass of gel is substantially completely exposed to the air as in the case of the dotted line showings in Figs. 3 and 4, the rate of evaporation will be greater, due to the larger surface area exposed, than will the rate of evaporation from a portion of gel exposed as through the restricted discharge opening 25. Thus the body of gel in the volatilizing chamber 14 will be consumed at a much more rapid rate than the body exposed through the opening 25 until a substantial amount of shrinkage has taken place in the lower gel body. As the portion of gel exposed through the opening 25 becomes a greater proportion of the total gel surfaces exposed within the volatilizing chamber 14, shrinkage of the gel body 15' partially exposed at the opening 25 will accelerate eventually to the point where the exposed gel body 15' can pass through the opening 25, thus permitting a fresh body of gel 15 to become exposed at the opening 25.

Figs. 4, 5 and 6 are intended to show typical different stages in the consumption of gel. In Fig. 4 the three gel bodies including the dotted line showing 15 is representative of the starting situation with three fresh bodies of gel. The smaller gel body 15" indicates the situation immediately after a gel slug 15' has dropped through the opening 25 and also represents substantially the amount of shrinkage in the gel body as shown in dotted lines that would be required before appreciable evaporation from the gel body 15' as shown in Fig. 4 would take place.

Fig. 5 is illustrative of an intermediate stage when the lower gel body 15" has shrunk to a considerable extent and evaporation and shrinkage of the exposed gel body 15' has become quite advanced. In Fig. 6 of the drawing the lower gel body 15" has shrunk to the point of being substantially spent and the exposed gel body 15' has evaporated and shrunk substantially to the point where it will pass through the opening 25. It will be noted in this connection that because of the substantial seal effected between the exposed gel body 15' and sides of the passage 25 there is no appreciable circulation of air in the chamber 13 and upper bodies of gel 15 thus remain fresh and unchanged until exposed by dropping of the gel body 15'.

As previously mentioned, the relationship between the side or width of the opening 25 and the initial diameter of the gel slug 15 is an important factor in synchronizing the dropping of gel slugs 15' and the consumption of previously dropped gel slugs 15". It has been found that a ratio of about 3 to 4 between the width of opening 25 and diameter of gel slug 15 is suitable for this control. Thus with a gel body one-and-a-half inches in diameter, the

width of opening 25 should be approximately one-and-one-eighth inches.

It is not essential that the gel slug 15" be completely spent before the exposed slug 15' is dropped. In fact the substantially spent slug 15" may continue to give off vapors for a considerable period of time and in practice several spent slugs 15" may be permitted to accumulate in the volatilizing chamber 14. In removing the spent slugs the bottom 10 of the device is forcibly removed from the body portion 11 giving access to the volatilizing chamber 14.

While the external structure of the device has been described in considerable detail, as well as the internal structure thereof, it is to be understood that in various adaptations of the invention much of the external detail could be modified or eliminated, and that in its broader aspects the invention comprises the combination as shown in Figs. 4, 5 and 6 of a volatilizing zone, a storage zone, or chamber separated from the volatilizing zone by a restricted passage which is substantially sealed by a partially exposed cylindrical gel body, said gel body progressively shrinking as volatile materials therefrom escape through its exposed portion until it drops through said opening.

It is to be understood that the particular size and shape of the openings 26 as shown in the drawing is purely illustrative and that the size and shape of these openings will be determined in particular instances by the evaporation characteristics of the material to be dispensed from the device. By way of illustration the openings 26 might be somewhat narrower and extended further down on the base part of the device. Such variation would have the effect of providing greater circulation of air in the lower portion of the volatilizing chamber 14 and would also provide for greater movement of the closure or cap member between the fully closed and fully open position in controlling circulation of air through the side openings. This greater movement in control would provide a corresponding increase in the degree of variation which the user could make in the rate of circulation of air through the device and emission of air treating vapors therefrom.

What we claim is:—

1. A vapor diffusing device for air treating gel in cylindrical slug form, said device comprising a storage chamber having a length and width closely conforming to the length and diameter of a predetermined sized cylindrical gel slug when disposed with its axis horizontally of said chamber, supporting means for said chamber providing a volatilization zone below said chamber, and means forming a restricted passage between the volatilization zone and said chamber, the opening provided by said restricted passage being substantially less than the diameter of a fresh gel slug to thereby support the gel slug within said chamber while exposing a portion of the cylindrical surface of

said gel slug for evaporation of volatilizable material therefrom.

2. A vapor diffusing device as defined in claim 1 wherein said restricted passage is formed by inwardly and downwardly extending vanes providing engagement with a cylindrical gel slug along lines extending longitudinally thereof.

3. A vapor diffusing device as defined in claims 1 or 2 wherein the ratio between the width of said passage and diameter of said cylindrical gel slug is approximately a 3 to 4 ratio.

4. A vapor diffusing device as defined in any of the claims 1 to 3 wherein side walls of the volatilizing zone and storage chamber constitute portions of a unitary body part having frictional snap engagement with a detachable bottom part and telescoping sliding engagement with a top closure part.

5. A vapor diffusing device as defined in claim 4 wherein lower edges of said telescoping closure part register with and control apertures in opposed walls of said volatilizing zone.

6. A vapor diffusing device as defined in claim 4 wherein lower edges of said telescoping closure part register with and control apertures in opposed walls of said volatilizing zone, and cooperating means on said closure part and body part facilitate adjustment of said closure part with respect to said apertures.

7. A vapor diffusing device as defined in any of the claims 1 to 6 wherein the outer structure enclosing said storage chamber and

volatilization zone is provided by a rectangular base, a body part open at both top and bottom ends and having means at the bottom end thereof for snap engagement with said base, and a closure member having telescopic engagement with said body part for closing the top end thereof, the lower portion of said body part having openings in opposed sides thereof adapted to be opened and closed in the sliding movement of said closure member, and the means forming a restricted passage between said storage chamber and volatilization zone are integral with and internally of said body part.

8. A vapor diffusing device as defined in claim 7 wherein outer surfaces of the body part are inwardly offset to permit outer surfaces of said closure part to be substantially flush with outer surfaces of the remainder of said body part.

9. A vapor diffusing device as defined in claim 8 wherein the inwardly offset portions of said body part adjacent the apertures therein continue as ribs below said apertures.

10. A vapor diffusing device as defined in any of claims 7 to 9 wherein the apertured portions of said volatilizing chamber are disposed outwardly beyond the point of alignment with corresponding walls of said storage chamber, thereby facilitating the circulation of air throughout said chamber.

11. A vapor diffusing device substantially as disclosed in the accompanying drawing and described with reference thereto.

MARKS & CLERK.

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Fig. 1.

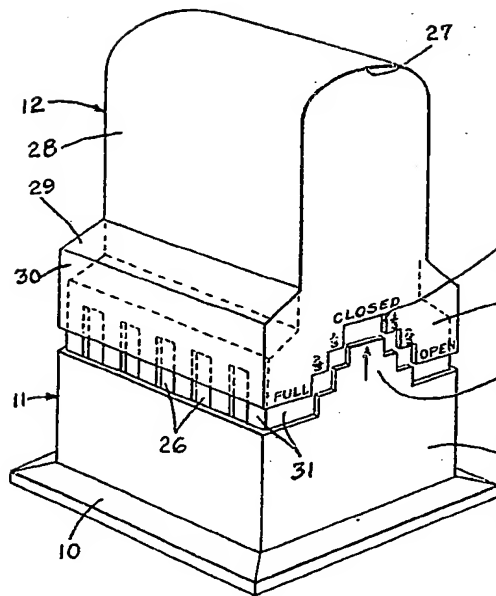


Fig. 2.

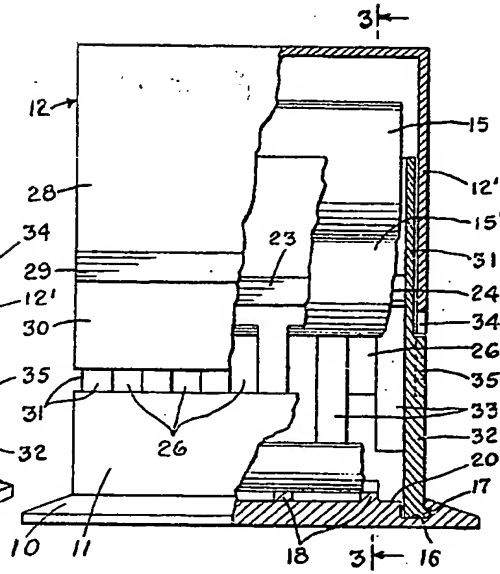
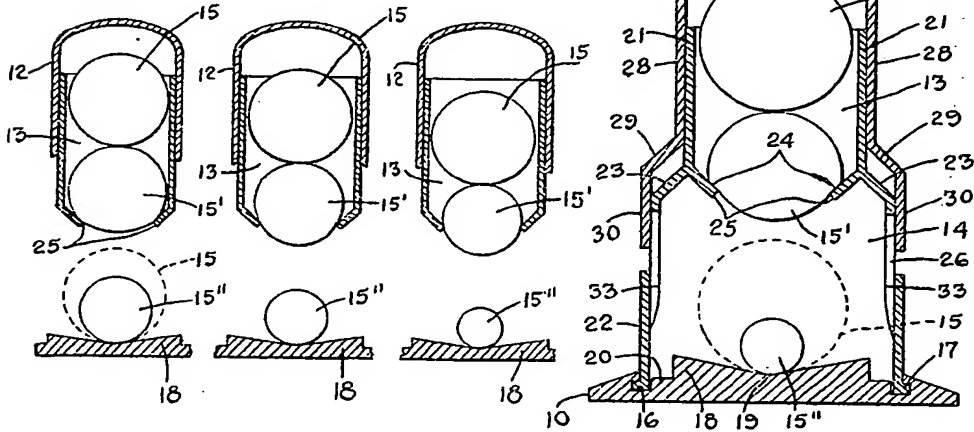


Fig. 3.

Fig. 4. Fig. 5. Fig. 6.



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